Florida Department of Health
Onsite Nitrogen Reduction Strategies Study

Contract CORCL

TASK B.8

Operation, Maintenance and Repairs Report for Passive Nitrogen Reduction System B-HS2

November, 2014

Task B of the Florida Onsite Nitrogen Reduction Strategies Study (FOSNRS) includes performing field experiments to critically evaluate the performance of nitrogen removal technologies that were identified in FOSNRS Task A.9 and pilot tested in Task A.26. To meet this objective, full-scale treatment systems were installed at various residential sites in Florida, operated on septic tank effluent under actual onsite conditions, and monitored over an extended timeframe.

This report summarizes the operation, maintenance, and repairs required for the passive nitrogen reduction system installed at a home site in Hillsborough County, Florida (B-HS2) in September, 2012. Design and construction details were presented previously in the Task B.6 Field System Installation Report for this system. The field system monitoring reports that document system performance, operation, and maintenance issues were presented previously in Task B.7 documents for each monitoring event. The B-HS2 system performance was monitored from October 2012 to March 2014.

Overall this system required very little maintenance. A Hazen and Sawyer technician visited the site on a monthly basis; however, the only maintenance required was cleaning of the septic tank effluent screen. There were several major issues related to the start-up of the system as outlined in Table 1 below. The pump floats were not installed in the correct positions. Following the bottom float placement adjustment on January 17, 2013, the system operated as expected. A description of the start-up issues, routine operation and maintenance items (O&M), the entity that performed the repair/maintenance, and the associated cost are included in Table 1. Table 2 is the summary log of repairs, maintenance actions, inspection results and system observations since start-up. This data, along with data from the other full-scale systems evaluated in Task B, will be used to estimate O&M effort and cost for full-scale passive nitrogen reduction systems (PNRS) in the Life Cycle Cost Analysis (Task B.13).

Table 1. Site B-HS2: Summary of start-up, routine operation and maintenance issues, repairs and refinement actions

Date	Start-up Issues	Routine Operations & Maintenance Issues	Repairs	System Refinement	Time Required (hr)	Estimated Cost[1]
9/27/12	H&S adjusted throttling globe valves, recirculation rate target of 3:1				1	$75
11/7/12	Pump tank high level alarm. H&S reset floats.				0.5	$38
12/21/12	Pump tank high level alarm. H&S reset floats.				0.5	$38
12/22/12	Pump tank high level alarm. H&S reset floats.				0.5	$38
1/3/13	Pump tank level below top float. H&S repositioned floats and wires on float tree.				0.5	$38
1/10/13	Pump tank high level alarm. H&S reset floats.				0.5	$38
1/16/13	Pump tank high level alarm. H&S reset float tree.				0.5	$38
1/17/13	Pump tank high level alarm. H&S corrected float tree. H&S repositioned bottom float which was swinging up into middle float.				0.5	$38
8/7/13		Cleaned STE filter effluent screen		H&S revised recirculation operation return from the recirc tank to Stage 1 sprayers	1	$75
4/30/14		Cleaned STE filter effluent screen			0.5	$38

ME = maintenance entity = Averett Septic Tank Inc.

H&S = Hazen and Sawyer (field technician)

HO = homeowner

CHD = county health department

[1]An hourly rate of $75 was assumed for maintenance entity labor.

Table 2. Site B-HS2: System inspections, observations, maintenance actions, and repairs log

Date	Description
7/31/2012	Existing system evaluation performed. Septic tank was pumped out.
8/15/2012	Local DOH performed site evaluation
9/10/2012	System construction started
9/25/2012	System start-up
9/27/2012	Globe valves were set at 3.5:1 recirculation ratio to recirc tank
10/5/2012	Tanks full
10/11/2012	Preliminary sample event 1
10/23/2012	Preliminary sample event 2
10/30/2012	Preliminary sample event 3. Low level in pump tank.
11/7/2012	Very high level in pump tank.
	Pulled float tree up (reset floats), and pump immediately came on.
12/3/2012	Sample Event No. 1
12/21/2012	Very high level in pump tank.
	Pulled float tree up (reset floats), and pump immediately came on.
12/22/2012	Very high level in pump tank. Audio alarm came on and was reset.
1/3/2013	Water level below top float in pump tank
	Re-positioned floats and zip-tied wires to tree.
1/10/2013	Very high level in pump tank.
	Pulled float tree up (reset floats), and pump immediately came on.
1/16/2013	Floats not registering in panel
	Pulled float tree up (reset floats)
1/17/2013	Very high level in pump tank.
	Moved bottom float down
	Re-wrapped wires and checked lights in panel, floats registered.
2/5/2013	Sample Event No. 2
2/27/2013	Site visit. Cleaned out leaves from DBOX.
4/16/2013	Sample Event No. 3
5/29/2013	Site visit. System ok
6/4/2013	Sample Event No. 4
7/8/2013	Site visit. System ok
8/7/2013	Sample Event No. 5
	Revised recirculation operation return from the recirc tank to Stage 1 biofilter spray nozzles
	Cleaned STE effluent screen
9/3/2013	Site visit. System ok
	Recirculation ratio still at 3:1
9/6/2013	Site visit. System ok
	Recirculation ratio still at 3:1
9/24/2013	Site visit. System ok
	Recirculation ratio still at 3:1

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Date	Description
10/7/2013	Sample Event No. 6
	Recirculation ratio still at 3:1
10/24/2013	Site visit. System ok
11/27/2013	Site visit. System ok
	Recirculation ratio still at 3:1
12/3/2013	Site visit. System ok
12/5/2013	Sample Event No. 7
12/30/2013	Site visit. System ok
2/13/2014	Site visit. System ok
3/10/2014	Sample Event No. 8
3/11/2014	Sample Event No. 9
3/12/2014	Sample Event No. 10
3/13/2014	Sample Event No. 11
3/14/2014	Sample Event No. 12
4/30/2014	Met with homeowner regarding system acceptance
	Cleaned STE screen
	Reset recirculation mode of operation to recirc tank